



Shoreline Assessment for the *M/V Selendang Ayu Response*

A Case Study

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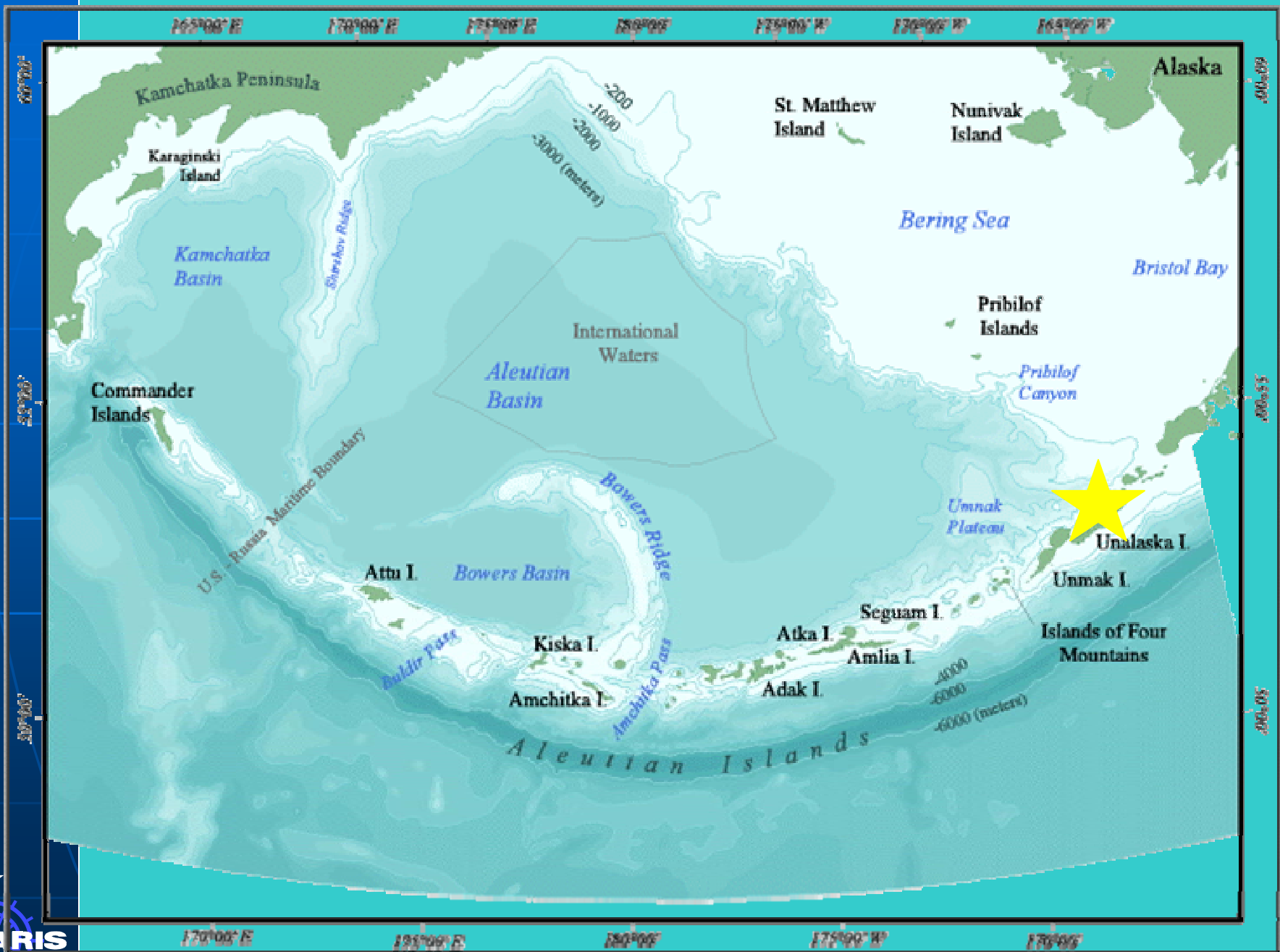


Outline

1. Overview of the Incident
2. Timeline of Shoreline Assessment Program
3. Initial Aerial Surveys
4. Winter SCAT Program
5. Spring/Summer SCAT Survey Program
6. Sign-off Program



Physical Geography of the Bering Sea and Aleutian Islands



Overview of the Incident

December 8, 2004

- M/V Selendang Ayu grounded near Skan Bay on Unalaksa Island.
- Lost fuel oil impacted approximately 300 km of coastline (~330,000 gall)
 - Vessel carried ~480,000 gallons IFO380 + diesel
 - ~148,000 gallons diesel and IFO380 were lightered in JAN to mid-FEB
 - Loss of soybean cargo



7 December 2004



9 December 2004



10 December 2004



11 December 2004



12 December 2004



13 December 2004



Command Post Dutch Harbor

50km straight line
from accident site

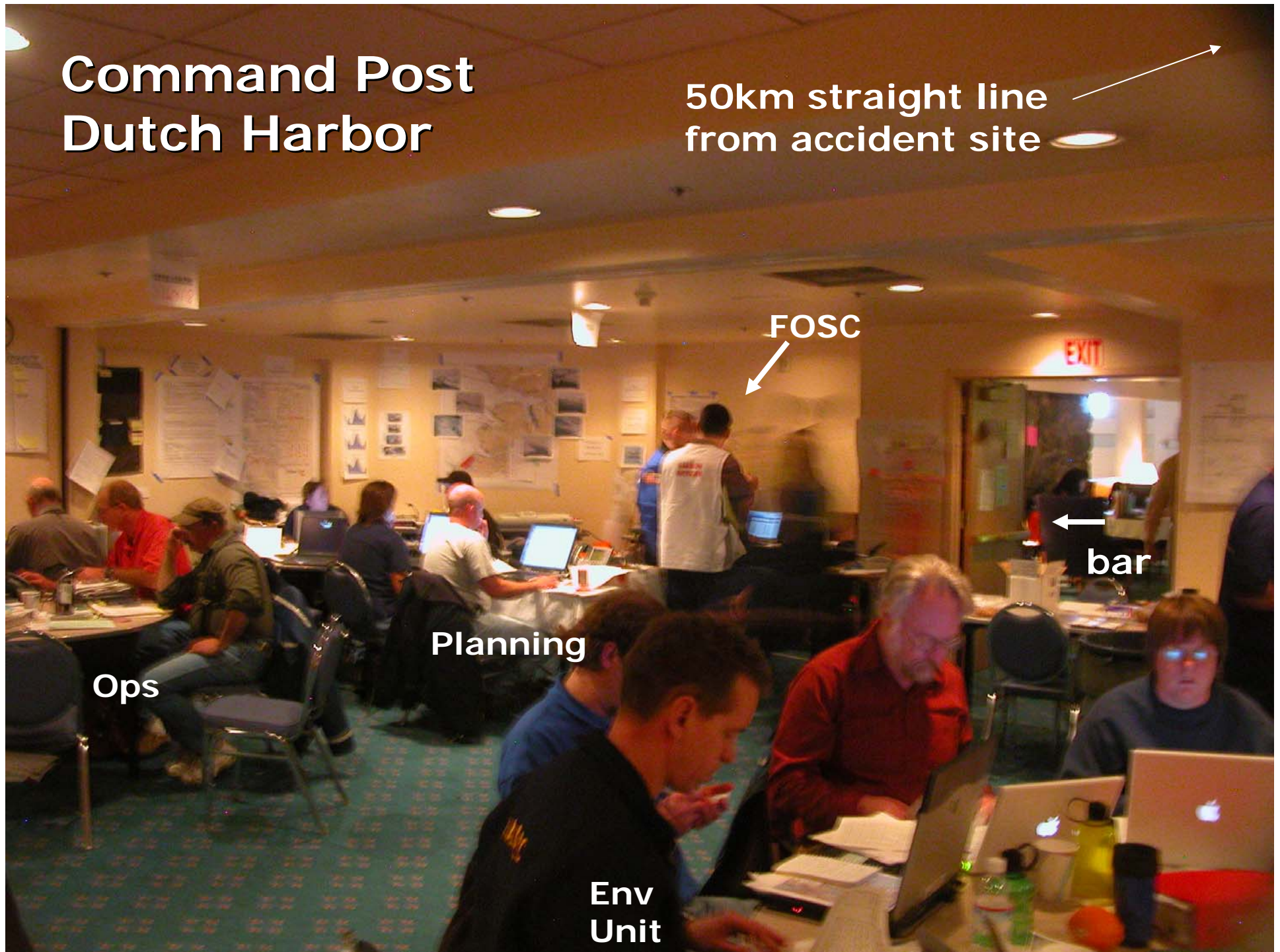
FOSC

bar

Planning

Ops

Env
Unit



Timeline: Winter Phase

Initial Winter Aerial Surveys

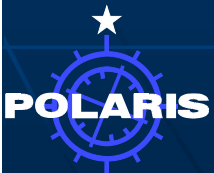
10-16 DEC 04

- Slick tracking
- Shoreline assessment survey

Winter SCAT Program

16 DEC 04 – 15 FEB 05

- Limited in scope due to weather/safety constraints



Winter Operations

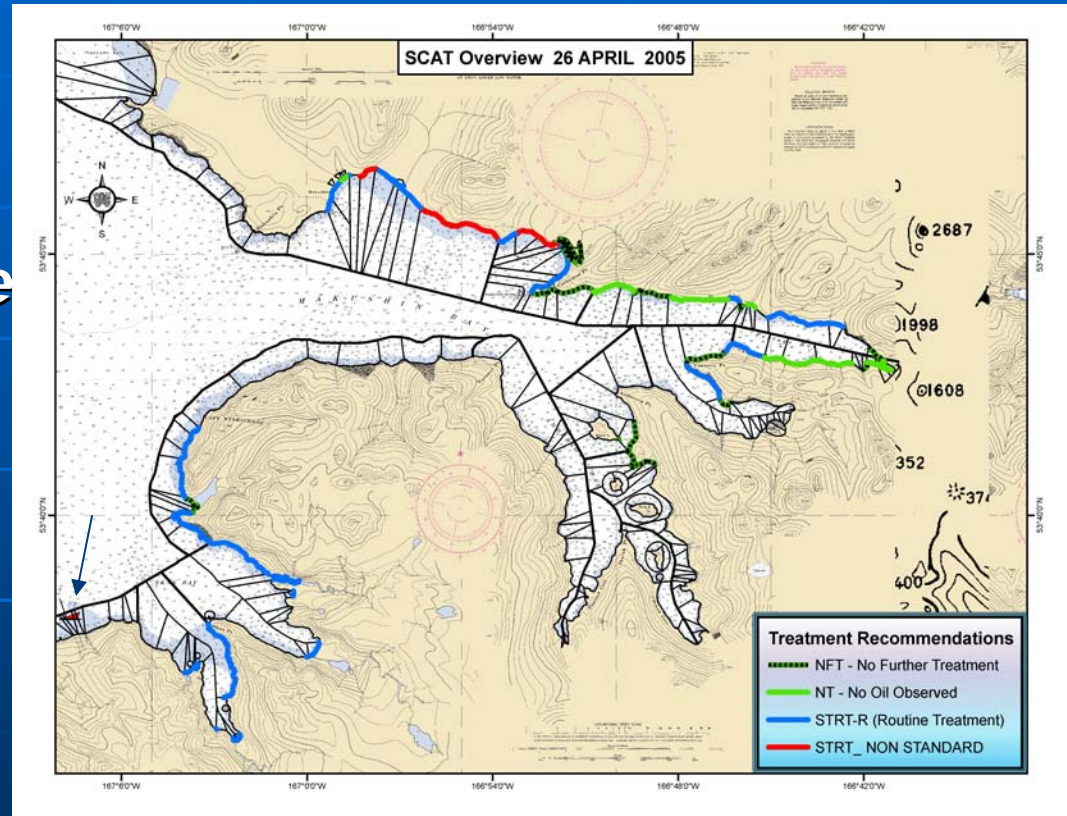
- Equipment and personnel on standby in Core Area in case of a further release from the vessel
- UC decided teams could start “gross” oil removal while on standby
- SCAT was initiated to support this winter operations effort
- Winter operations ceased on 15Feb after lightering and vessel inspected – no further threat of a release

Initial Operations Support

First step was to segment shoreline

- *Completed before the first overflight*

Foundation of all subsequent geographic data



Aerial Surveillance Slick Tracking

- Initial slick tracking on 11 Dec during first weather break
 - *to assess the potential for shoreline impacts*
- Status of oil remaining on vessel unclear, due to access difficulties, so surveillance program continued regularly throughout winter to monitor for possible releases
 - *continuous low altitude, fixed-wing surveys during weather windows*



Aerial Surveillance

8-passenger aircraft with comms system

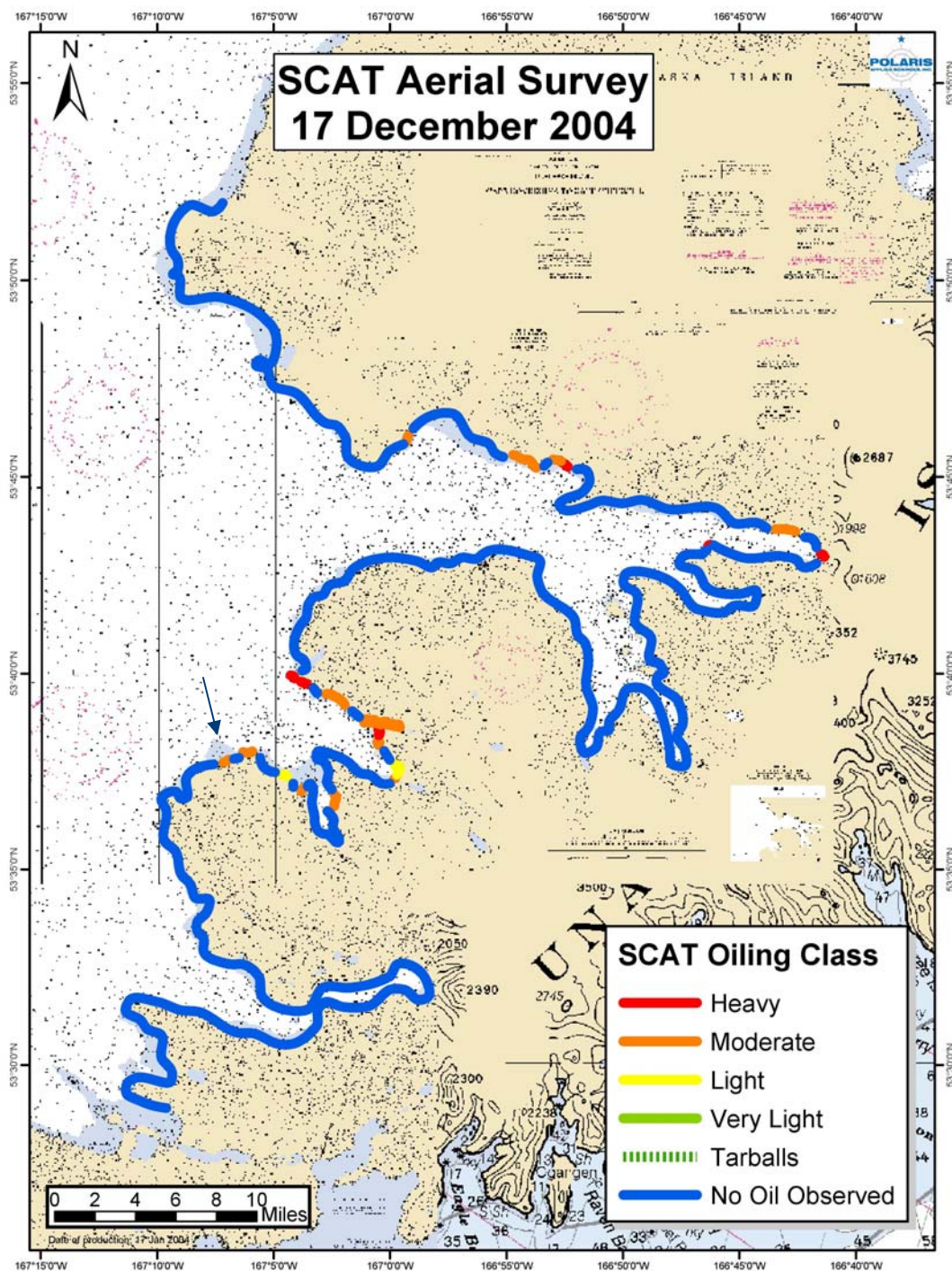


Initial Shoreline Assessment Survey to Support Ops

Aerial Mapping Video

- First low-altitude helo survey on **15/16 DEC**
- Mapped distribution of visible shoreline surface oil **17 DEC**
 - provided basis for a limited winter cleanup program





Estimate:

**Heavy + Moderate
= ~20 km**

Winter SCAT Program

Key Elements:

- Weather Constraints
- Safety Concerns
- Support to Ops
- Survey Statistics
- Cultural Resources



SCAT Winter Program

Program Management and Participation

- SCAT Coordinator
- Field Team Coordinator/Database Manager
- 1 Field Team of UC reps



SCAT Winter Survey Data Summary

460 defined segments in direct impact area,
Cape Cheerful, Unalaska Bay and Kalekta Pt

over 296 km (289 segments) surveyed by
SCAT teams and input into database

85 miles of shoreline (86 segments) had
some form of oiling (Heavy, Moderate, Light,
Very Light, or tar balls: H+M = 32 miles)

34 segments identified for immediate winter
gross oil removal for Operations



CULTURAL RESOURCE PROGRAM GOALS

- locate and assess archaeological sites
- determine potential treatment and backshore staging effects
- mitigate potential treatment effects
- maintain site location confidentiality



village site

Timeline: Spring-Summer Phase (1)

Spring-Summer SCAT Program

06 APR 05 – 17 JUN 05

- Prep time – development of comprehensive program through consensus-building
- Developed SCAT Manual prior to survey: included definition of Survey Area
- Established Treatment Recommendations and Constraints; and Endpoint Criteria (pre-determined by ADEC)
- Team training/calibration (**05 APR 05**)



Timeline: Spring-Summer Phase (2)

Inspections-Segment Sign Offs

01 JUN 05 - now

- First segments signed off on **12 JUL**: SCAT overlap
- Ongoing through **SEP** with planned spring 2006 inspection



Spring/Summer SCAT Topics

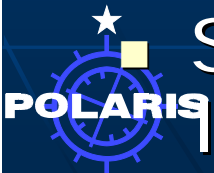
1. Spring/Summer SCAT Manual
 - Key Elements
2. Decision Process through consensus-building of UC reps
3. Treatment Recommendations
4. Teams
5. Endpoint Criteria
6. Sign-off Process



Spring/Summer SCAT Manual

1. Key Elements

- Field Survey Methods
 - Geographic Survey Area
 - Schedule
 - Management, Participation
- SCAT Database and Forms
- Field Recommendations: Forms and other field data
 - Process of forms transmittal and approval
- Permitting and Consultations
 - Ecological and Cultural Constraints
- Shoreline Treatment Endpoints and Final Inspections



SPRING 2005 – GROUND SCAT

Teams A and B

Helicopter mobilized

- Surveyed priority segments in the “core area” areas between Spray Cape and Brundage Head on Unalaska Island.



Teams C and Team D

Vessel-based

- Surveyed remote coasts away from the “core area” and segments not accessible by helo

PTN-4







SCAT Data Summary

806 segments (763 km) surveyed, from east Umnak Island to west Akutan Island

- 324 segments in 'core' area (Spray to Makushin)

125 segments of shoreline (114 km) had some form of oiling recommended for treatment (**STRT** form)

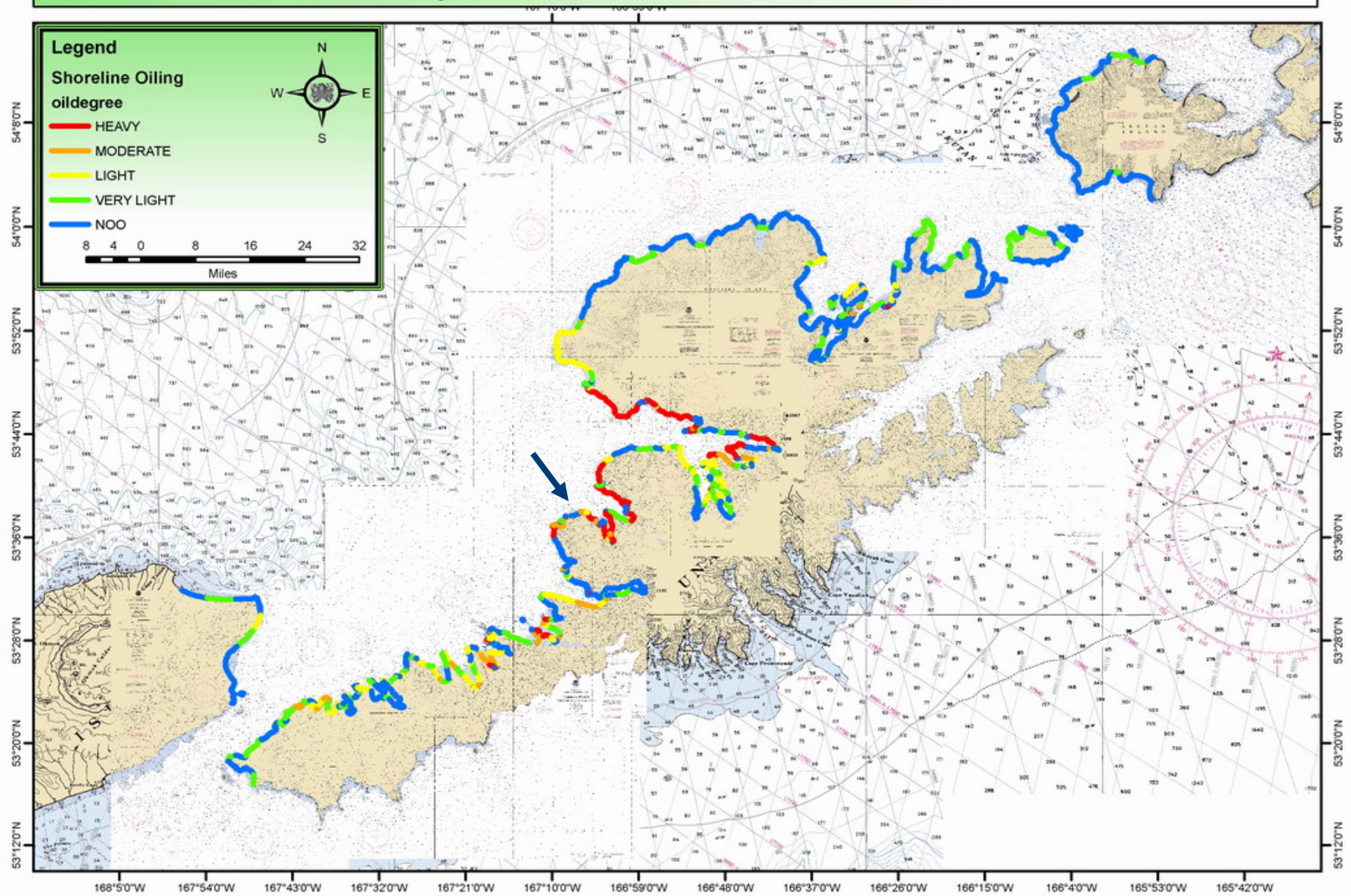
681 segments of shoreline (649 km) did not require any treatment (**SIR** form)

- 290 segments/304 km No Further Treatment (**NFT**)
- 391 segments/345km No Oil Observed (**NOO**)

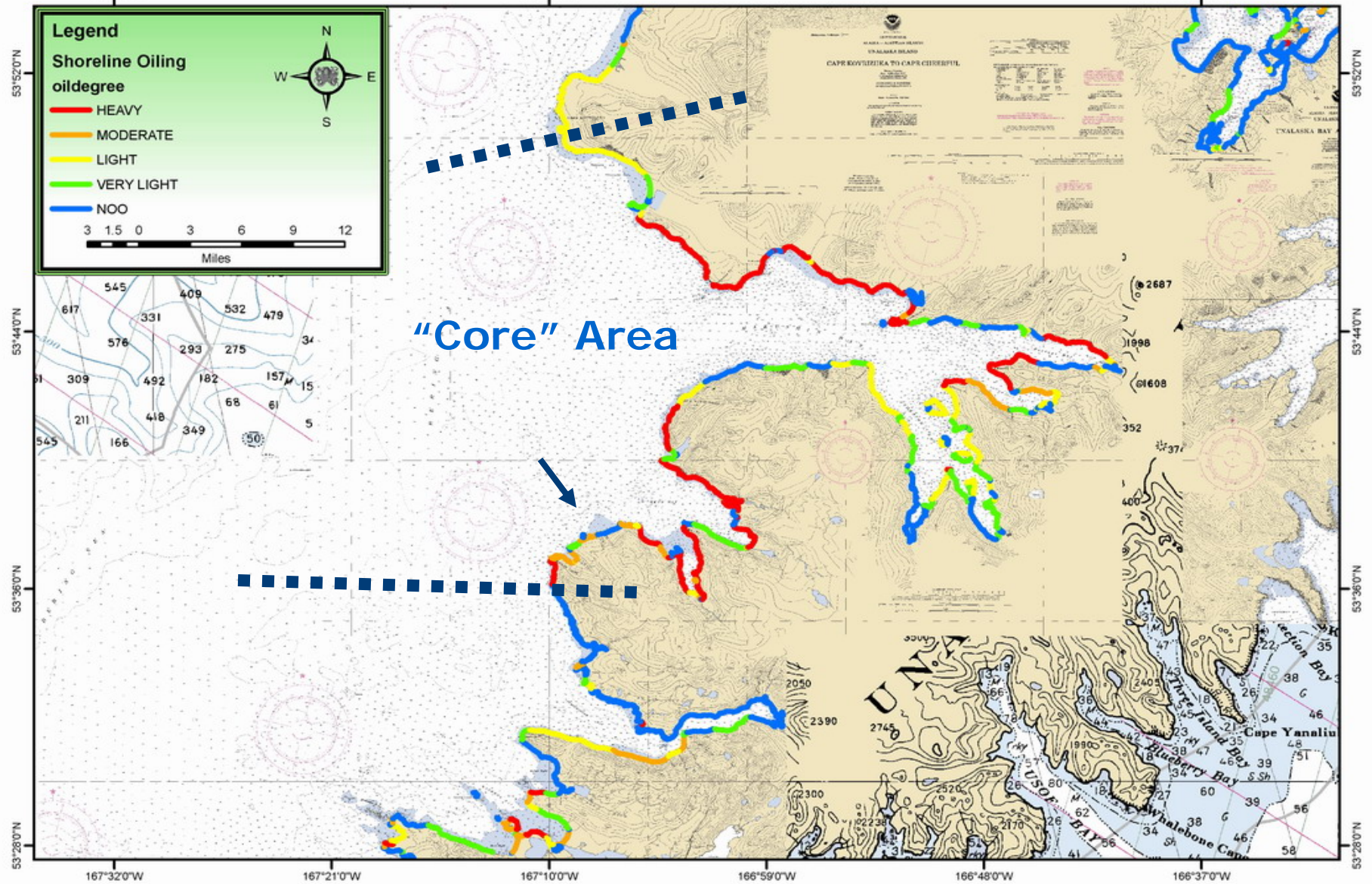


M/V Selendang Ayu

SCAT Survey's Performed: 10 APR 2005 - 18 JUN 2005

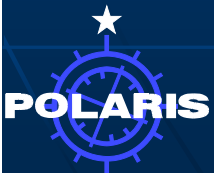


M/V Selendang Ayu (Core Area) SCAT Survey's Performed: 10 APR 2005 - 18 JUN 2005

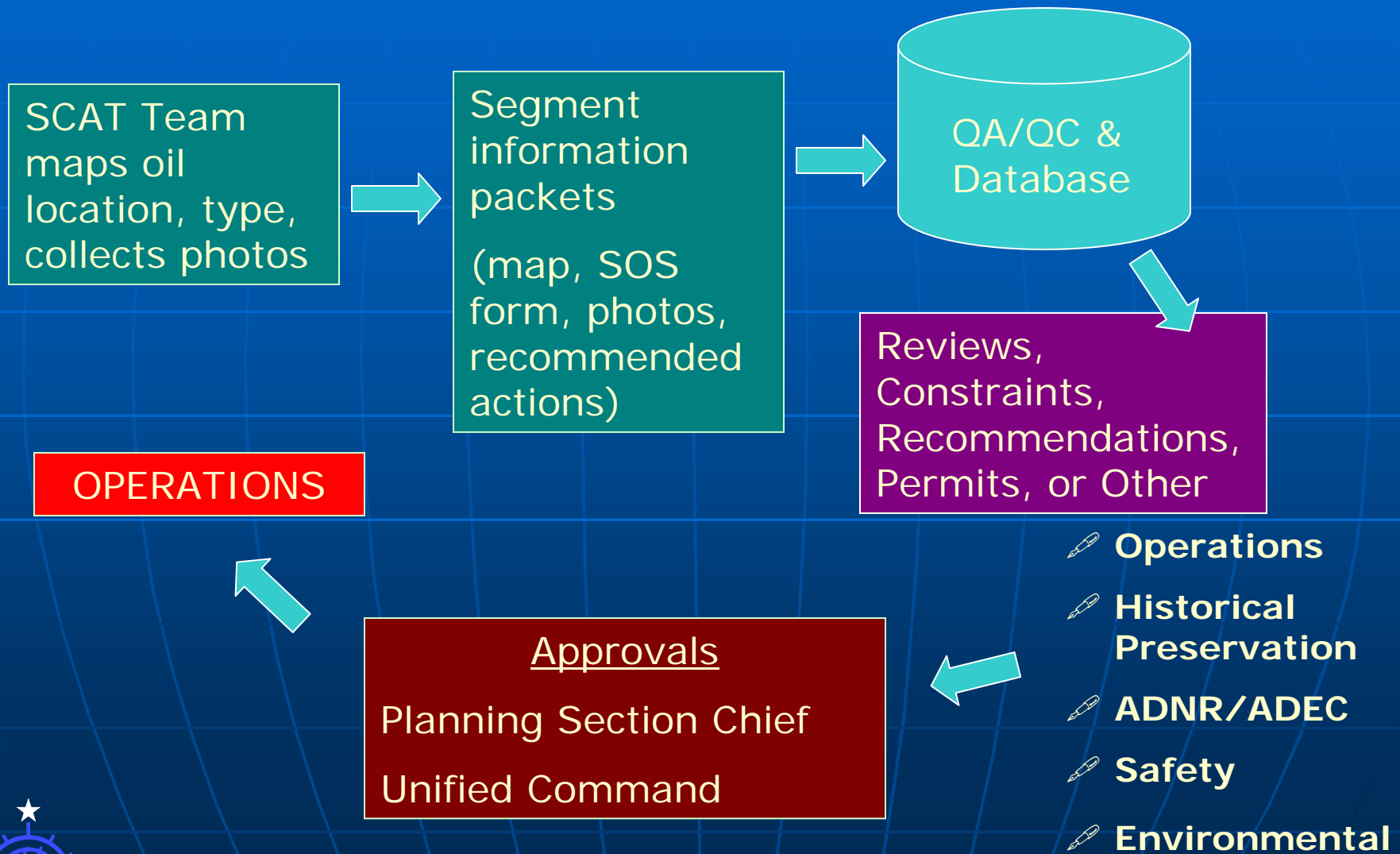


SCAT Summary Data

Oiling Category	km	%
Heavy	15.5	2.0
Moderate	4.0	0.5
Light	21.8	2.9
Very Light	9.1	1.2
No Observed Oil	712.6	93.4
TOTAL	763.1	



2. PROCESS



3. Shoreline Treatment Recommendations

- SHORELINE TREATMENT RECOMMENDATION TRANSMITTAL (**STRT**) form – recommendations provided by the SCAT team
- SHORELINE INSPECTION REPORT (**SIR**) form– No Observed Oil (**NOO**) or No Further Treatment (**NFT**) required

Pre-Approved Treatment Techniques

Maintained in the SCAT Manual

- Manual removal
- Mechanical removal
- Tilling
- Sediment relocation
- Burning oiled debris



Shoreline Treatment Recommendation Transmittal Form⁽¹⁾

Site Location:
 Segment: Length (m): Survey Date:
 Shoreline Type: Substrate: Coastal Character:

Box 1 Oiled Area for Treatment (EU)

Zone A 168m x 15m 75% PO, 10-20cm thick.
 Zone B 60m x 60m 12% PO, some recoverable patties.
 Zone C 50m x 10m 60% po 10-20cm in 20m area - rest is splatter.

Box 2 Treatment Recommendations (EU)

Manual Removal - several people with shovels, 3+ days.
 ROUTINE as per App. J in SCAT manual.

Box 3 Recommendations / Staging and-or Logistic Constraints / Waste Issues (OPS)

Only accessible by boat. Rocky headland - safety constraint.

Box 4 Ecological Resource Comments

Special Consideration - avoid approaching within 330 feet of active bald eagle nests on KFP01 and KFP03.

Constraint:

Box 5 Cultural Resource Comments (HPS)

Report any cultural resources found during operations to the FOSC Historic Properties Specialist or Environmental Unit Leader.

Constraint:

Box 6 Safety Issues (EU/OPS/SSO)

- 1) Slip, trip, fall while climbing over boulders - keep one hand for yourself, no two-hand carries.
- 2) Keep bags, bundles, gear light enough for one hand carry.
- 3) Select secondary access/extraction route prior to beginning operations.
- 4) Consider shortened work day if access requires strenuous climbing.

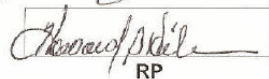
Attached: ☒ Segment Map ☒ Sketch Map ☒ SOS Form ☐ Fact Sheet ☐ Other

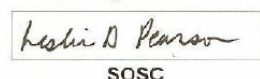
FINAL
APPROVALS:


Environment Unit Lead


Planning Section Chief


Historic Property Specialist


RP


SOSC


FOSC

Prepared By: Date Prepared:

To Ops

To HPS

To DNR

To SOS

To EUL

To PLN

To UC

Final Approval
to OPS

Final Approval
to EUL

1- Complete all Boxes and forward to appropriate party for comments / approval via tracking designation.

STRT Form



Segment Inspection Report

Segment ID	HMP-01		
Date of Survey	22 Apr 05		
Time of Survey	1430		
Tide Stage			
Weather			

SCAT Team () Members			
If no further treatment is required, each UC rep sign below.			
Name		Signature	
Ruth Yelder	FOSC rep		Ruth Yelder
Crosby for Eagles	SOSC rep		Crosby for Eagles
Jeani Nelson	RP rep		Jeani Nelson

Inspection Completed Along Entire Segment?	YES / NO
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Treatment Endpoint Criteria:
Very light oil, widely scattered tar spots.

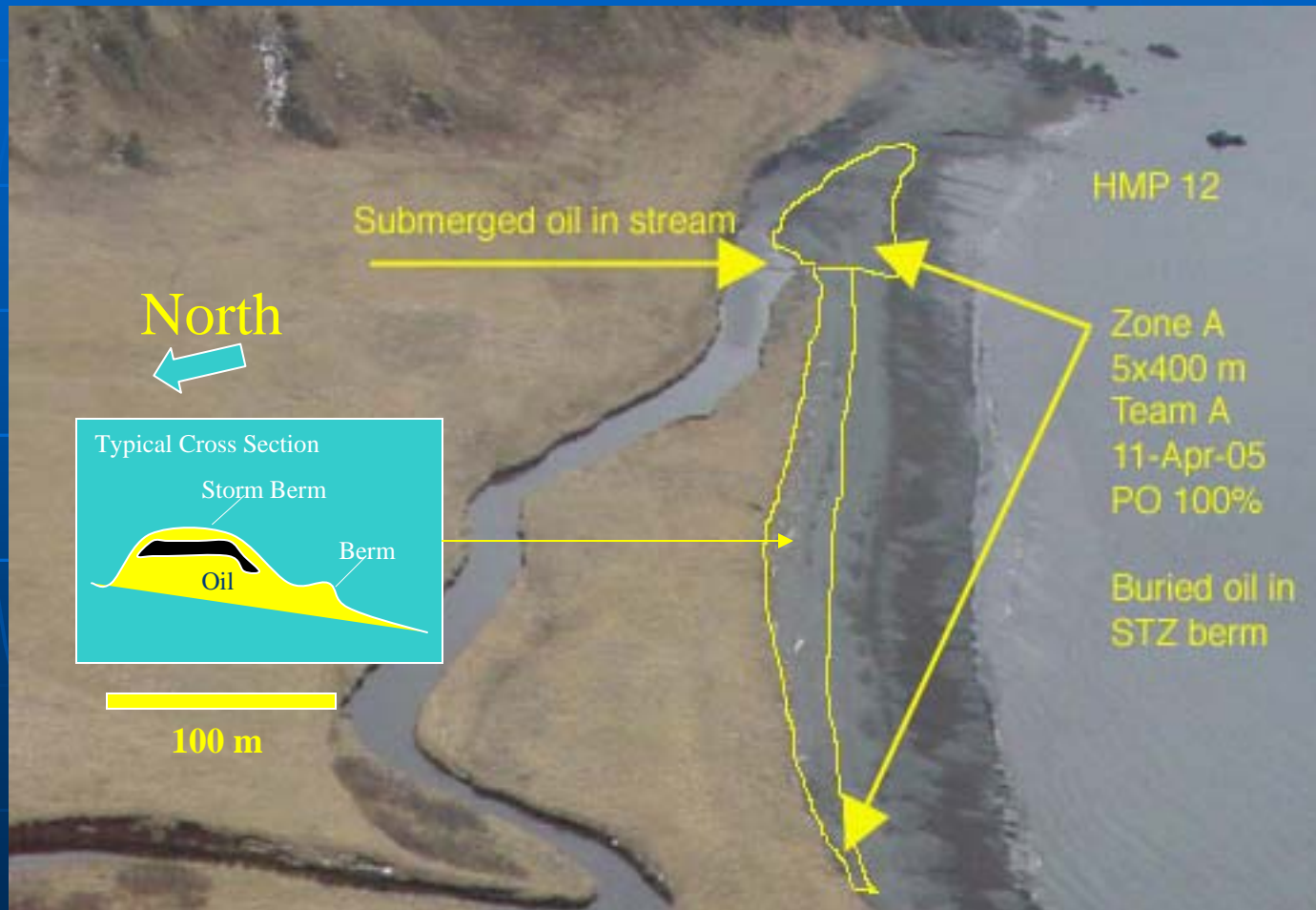
Is treatment or further treatment required? (circle one)
YES - define below specific treatment action(s) and specific locations within the segment where required. Provide sketches, maps, GPS coordinates to OPS.
<input checked="" type="radio"/> NO - each UC rep sign appropriate signature box above

Comments:	NFT
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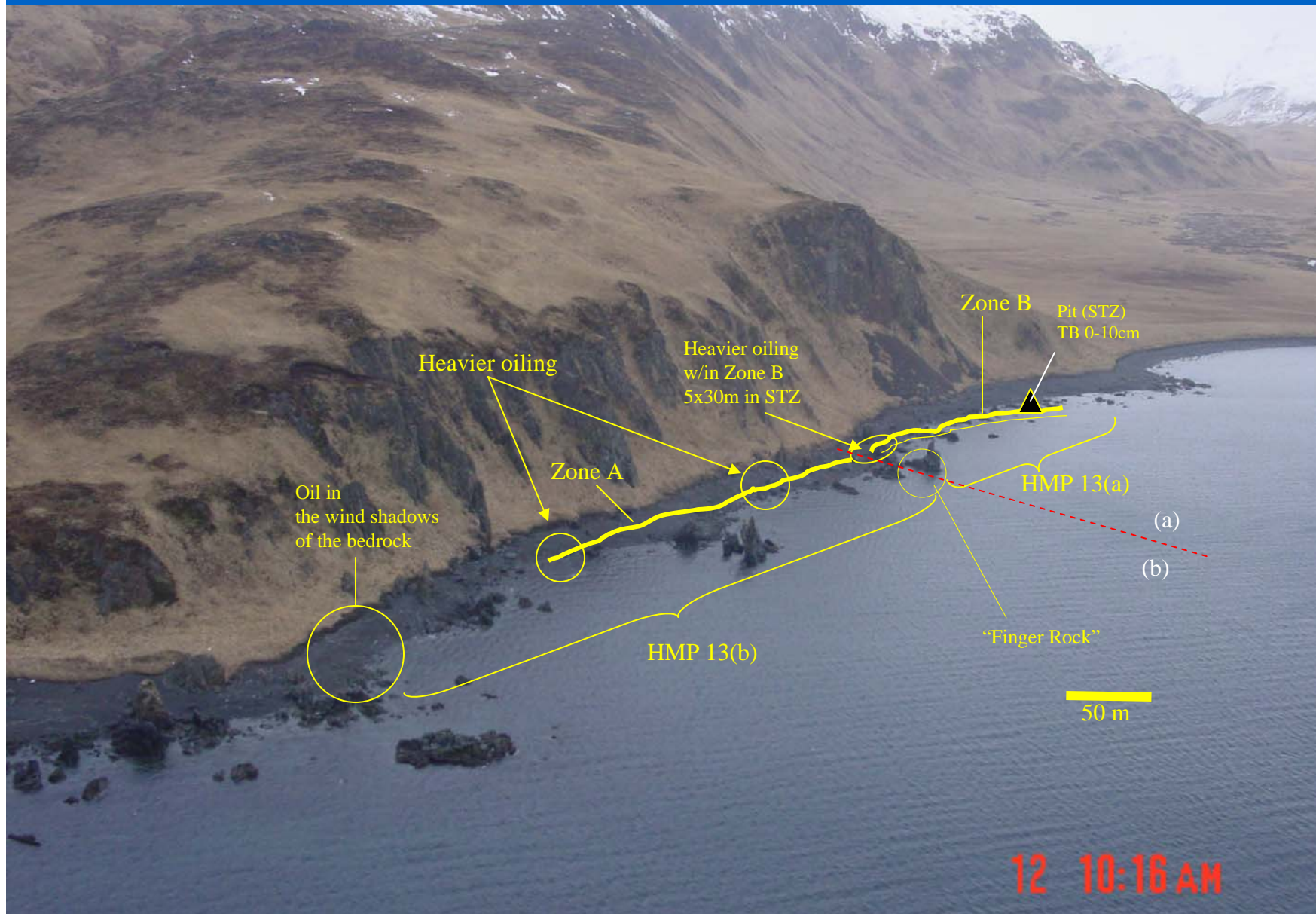
FOSC	SOSC	RP
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SIR Form

An NFT with a small amount of oil that was below the end-point criteria



HMP-13a and 13b



KFP 02 (map 2 of 2)
SCAT Team A
15 Apr. 05



Zone C
(see map 1 of 2)

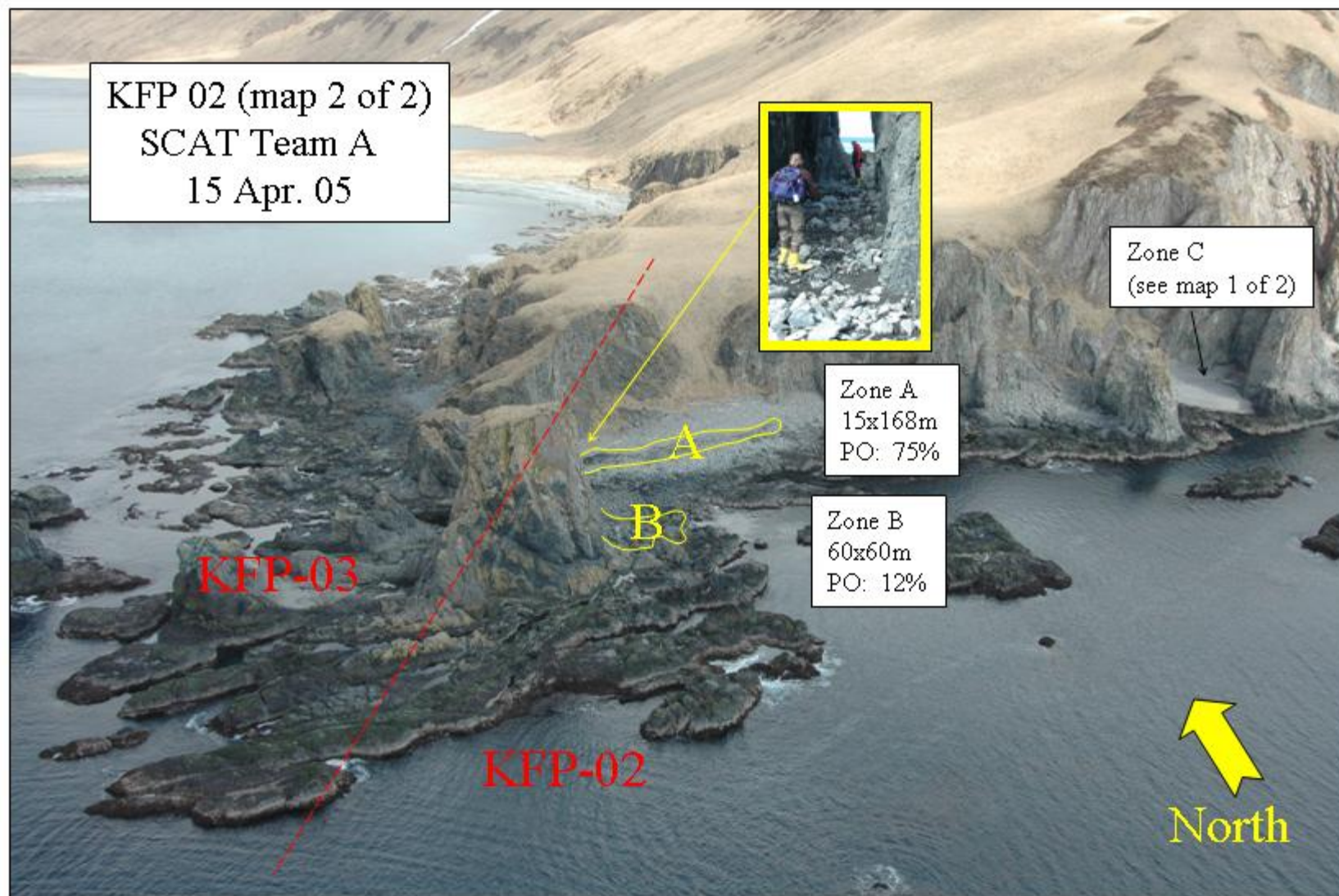
Zone A
15x168m
PO: 75%

Zone B
60x60m
PO: 12%

KFP-03

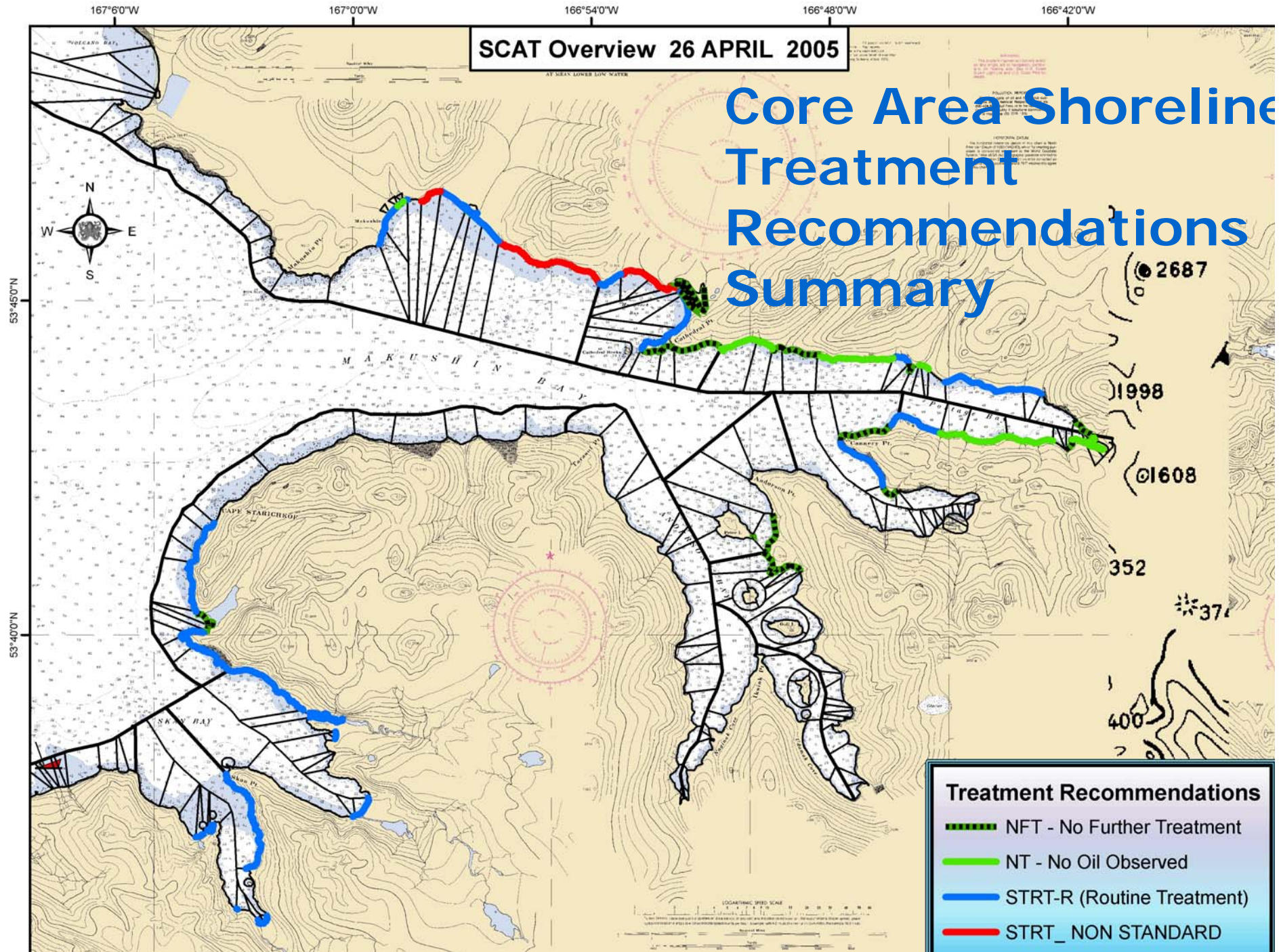
KFP-02

North



SCAT Overview 26 APRIL 2005

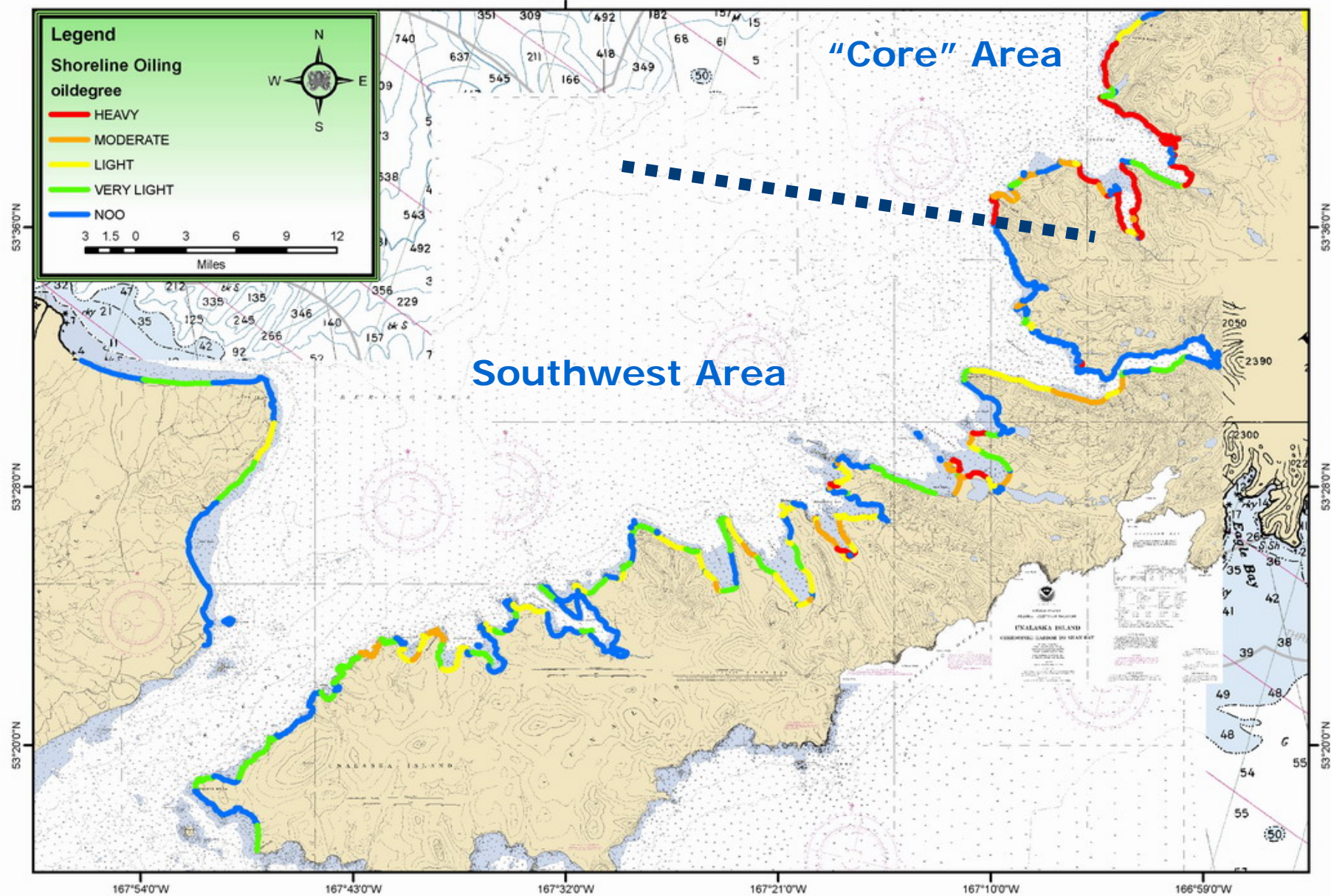
Core Area Shoreline Treatment Recommendations Summary



Treatment Recommendations

- **"STANDARD"** – techniques pre-approved by the agencies maintained in the SCAT Manual
- **"NON-STANDARD"** – involved evaluation and discussion between agencies and Operations using pre-approved techniques but with site-specific plans to direct Operations

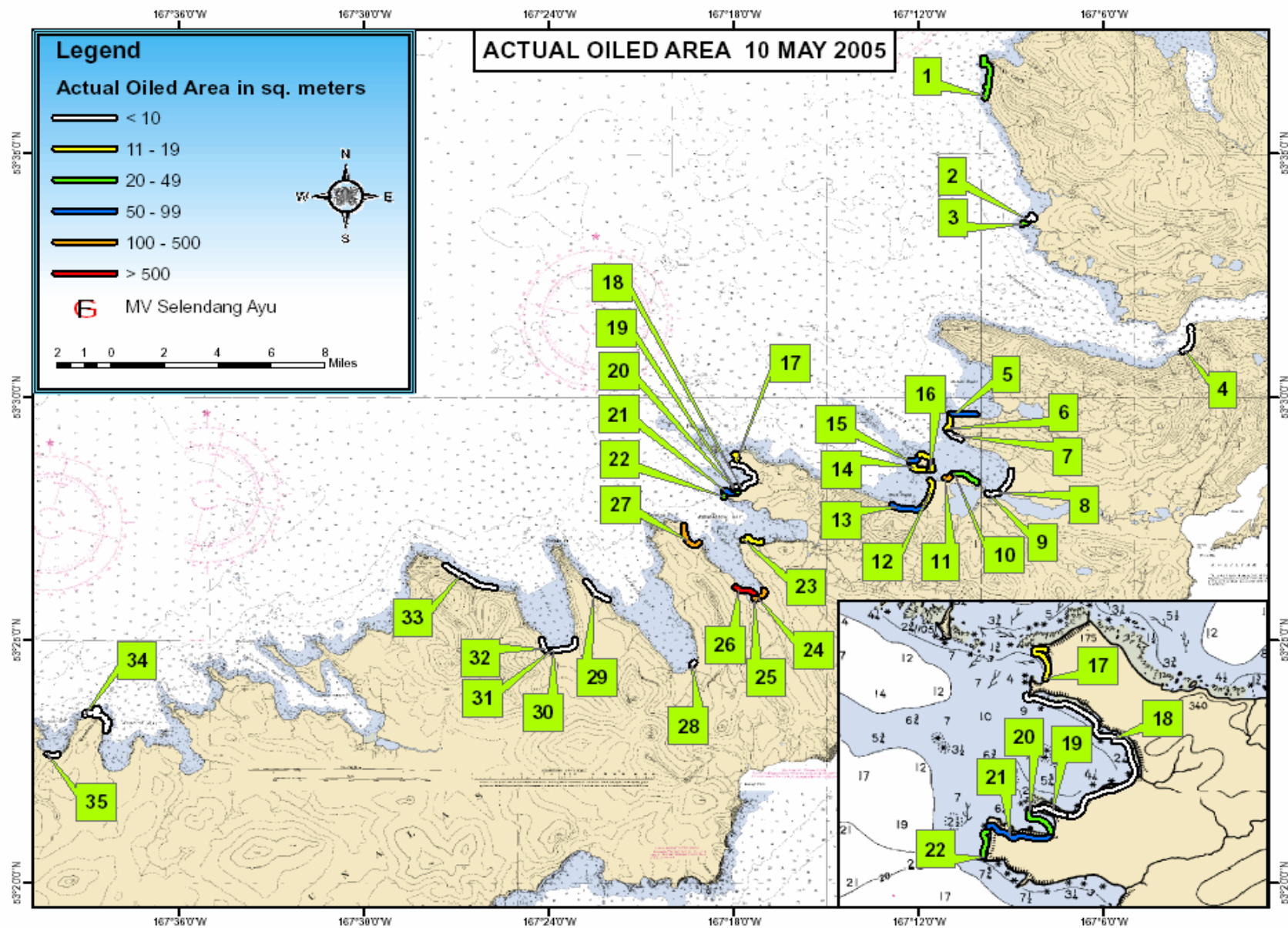
M/V Selendang Ayu (Southwest Area) SCAT Survey's Performed: 10 APR 2005 - 18 JUN 2005



Southwest Area Survey

- **35** of the **176** segments in the Southwest Area were recommended for additional treatment (**STRT**)
- **141** had either an **SIR** with **NOO** had an **SIR** with **NFT** (cleaned and signed off during the SCAT survey or below end point criteria)

SOUTHWEST AREA SHORELINE TREATMENT (STRT) LOCATIONS



A “One Stop” SCAT Strategy

- Outside of “core area” the UC representatives on the SCAT teams were empowered to recommend **NFT** or **NOO** on the **SIR** form
- Had an Ops person who could pick up small amounts of oil
- A “**cleanup as you go**” and a “**sign off as you go**” strategy
- Obviated the need to have to go back after the survey

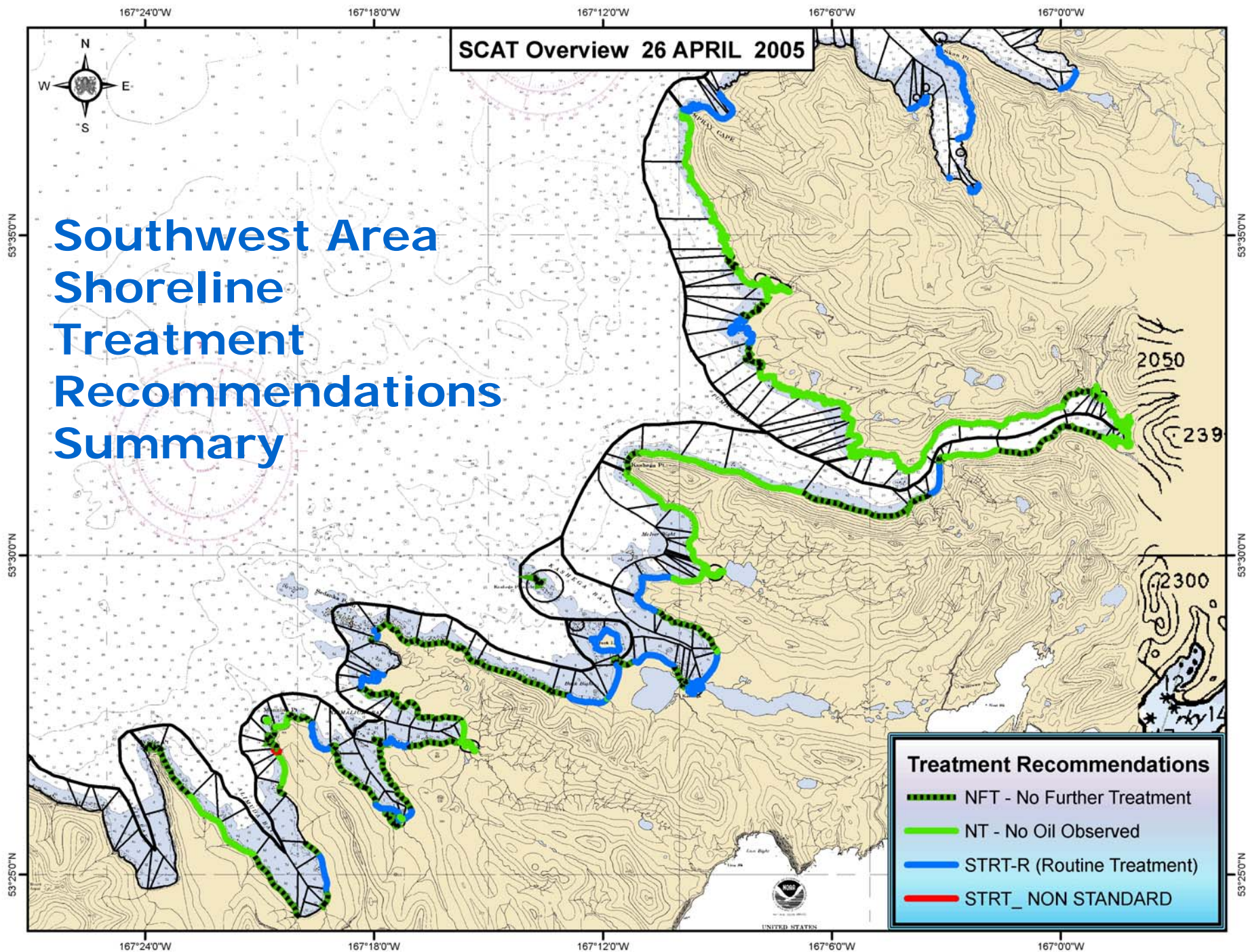


SCAT Overview 26 APRIL 2005

Southwest Area Shoreline Treatment Recommendations Summary

Treatment Recommendations

- NFT - No Further Treatment
- NT - No Oil Observed
- STRT-R (Routine Treatment)
- STRT_NON STANDARD

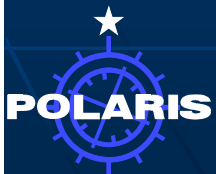


4. Teams

Each team includes at a minimum:

- an experienced shoreline oil observer responsible for completing the oiling documentation (**Oil Geomorphologist**, usually referred to as the "OG")
- a **responsible party representative**
- a **federal representative**
- a **state representative**.

*A Field Deployed
"Unified Command"*



SCAT Team Participants

Department of Environmental Conservation

Department of Natural Resources

US Fish and Wildlife Services

US Coast Guard

National Oceanic and Atmospheric
Administration (NOAA)

Specialists-

- Historic properties specialist (NLUR, Chumis)

- Coastal geomorphologists (Polaris)

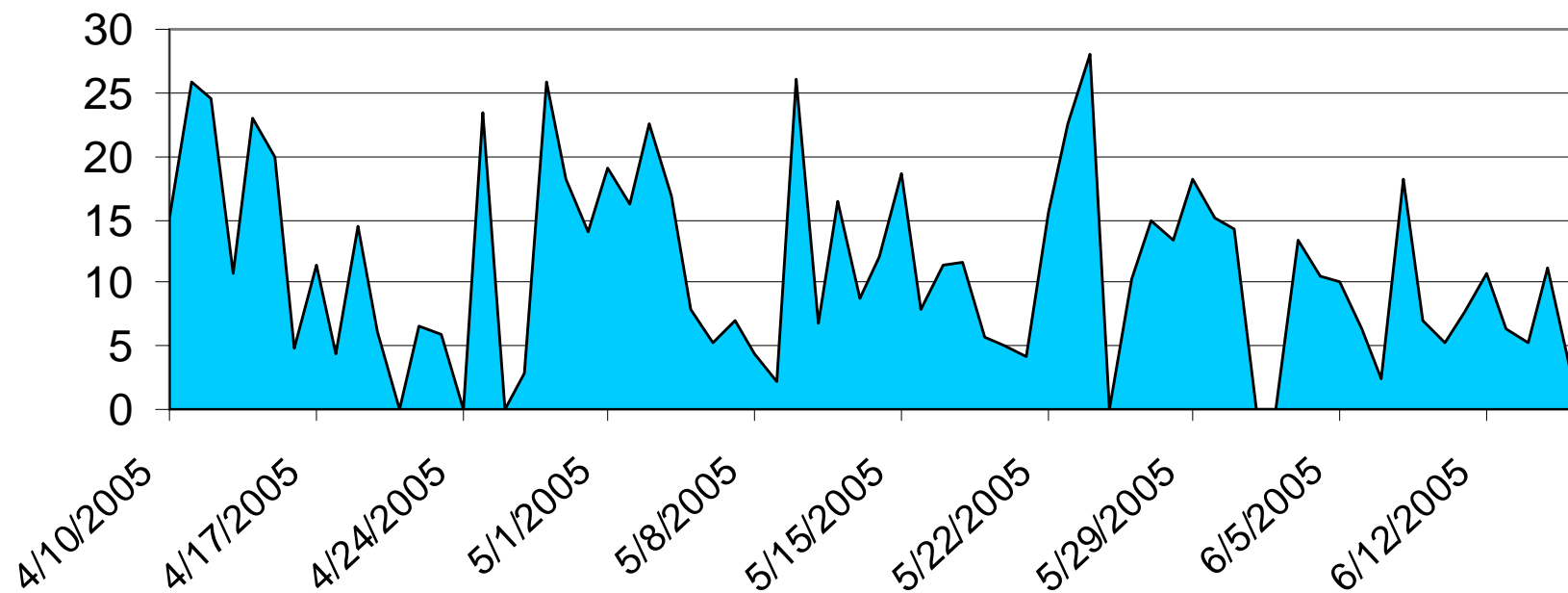
- Operations (outside the "core area")

- Others (SLR)



**Daily Length Surveyed
(km)**

DAILY SCAT SURVEY PROGRESS



SCAT Data Summary

- Field program - 68 days
- Total "team days" - 150
- Average shoreline length surveyed/day – 11 km
- Average daily rate/team – 5.1 km



5. Treatment Endpoint Criteria

- Chosen by State of Alaska:

“Lowest Practicable Level of Contamination” is a term defined in Alaska Law requiring spillers to clean up a discharge until the lowest practicable level of contamination is achieved. Alaska determines the lowest practicable level of contamination based on several items including protection of human health, safety, and welfare and of the environment; the nature and toxicity of the hazardous substance; the extent to which the substance has migrated or is likely to migrate; and the natural dispersion, attenuation, or degradation of contamination.”

MIXED SEDIMENT/GRAVEL/COBBLE - STEEP CLIFF BACKSHORE

Surface Oil

- Tarballs greater than 2 cm in diameter and all tar patties and tar mats removed
- Oiled sediment and gravel removed or cleaned to a light patchy (<20% coverage of coat (CT))
- Oiled cobbles and boulders removed or cleaned to light patchy (<20%) coverage of coat (CT)
- Oiled vegetation removed, to a light patchy (<20%) coverage of coat (CT)

Subsurface Oil

- Tar patties and tar balls greater than 5 cm in diameter removed
- Buried tar mats or oiled lens removed or cleaned to light (20%) partially filled pore spaces (PP)

Constraints

- Avoid damage to unoiled roots of vegetation
- Avoid destabilization of backshore
- Probably foot traffic only

MIXED SEDIMENT/GRAVEL/COBBLE - LOW BACKSHORE

Surface Oil

- Tarballs greater than 2 cm in diameter and all tar patties and tar mats removed
- Oiled sediment and gravel removed or cleaned to a light patchy (<10% coverage of coat (CT))
- Oiled cobbles and boulders removed or cleaned to light patchy (<10%) coverage of coat (CT)
- Oiled vegetation removed, to a light patchy (<10%) coverage of coat (CT)

Subsurface Oil

- Tar patties and tar balls greater than 5 cm in diameter removed
- Buried tar mats or oiled lens removed or cleaned to light (20%) partially filled pore spaces (PP)

Constraints

- Avoid damage to unoiled roots of vegetation
- Avoid destabilization of backshore

Treatment Endpoint Criteria by Shoreline Type

6. Inspection Process - Initial

When Ops deems segment treatment is complete, notifies EU/SCAT Coordinator

Segment pre-inspected by a SCAT team (**PEST**) - at endpoint criteria or additional work required?

- Agency Field Monitors, working with Ops Field Supervisors, ensure additional work completed.



6. Inspection Process - Final

Once ready for Final Inspection (by Agency Monitors), inspected by a Final Inspection Team empowered to

- (a) determine that end point criteria have been met and
- (b) recommend to the Unified Command that cleanup in that segment be terminated.
- The team uses the criteria in the "M/V *Selendang Ayu* Shoreline Cleanup Termination Endpoints 2005" (Appendix C) to make this determination.

Final Inspection team composed of UC Reps and Land Owners (or LO rep)



Final Inspection Process

- If no oil observed or segment is at end-point criteria:
 - UC reps on team sign SIR form and forward recommendation to UC for approval.
- If segment not at criteria by unanimous agreement of UC reps:
 - team notes on SIR work required, and
 - sends form to SCAT Field Coordinator/Data Manager who forwards to Operations via the EUL



Final Inspection Process

- *Determination that cleanup endpoints have been reached does not indicate that the segment is necessarily recovered or restored under the definition of the NRDA process.*



Conclusion

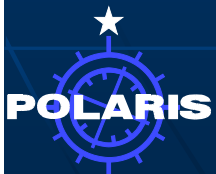
- SCAT was an integral and essential component of the response operation
- The shoreline oiling data provided the basis for setting priorities, recommending treatment actions, and evaluating the level of effort required by Operations
- The multiagency teams were the key vehicle to the inspection program that allowed the UC to sign-off a segment



M/V Selendang Ayu Response Operations

SHORELINE TREATMENT

Time series slides of selected
heavily oiled shoreline
segments before and after
treatment



31 Dec 2004

HMP11 Stream Mouth

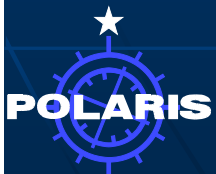
10 July 2005



HMP11 Stream Mouth

31 Dec 2004

10 July 2005



HMP11 Stream Mouth



13 Dec 2004



13 July 2005

PTN 03

27 Jan 2005

Inspection

10 July 2005





13 Dec 2004

HMP12

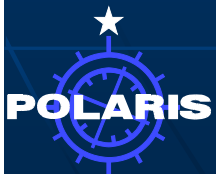


12 July 2005

SKN11 Beach

15 Dec 2004

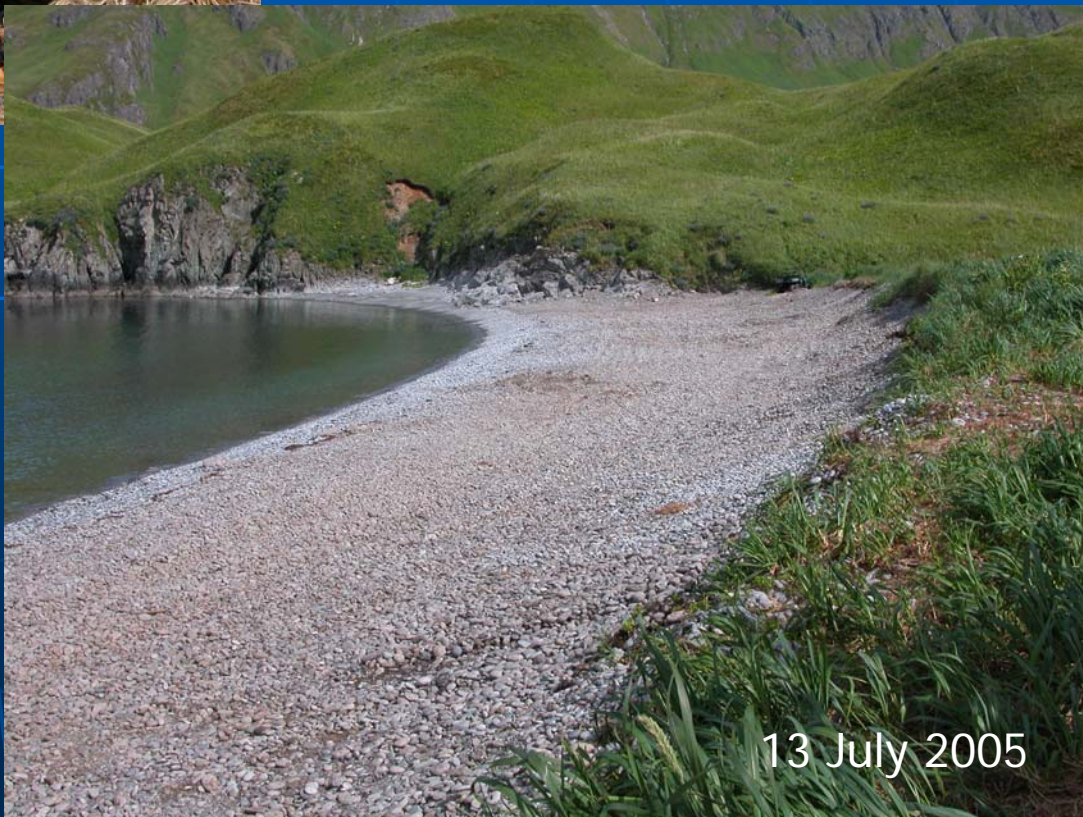
10 July 2005



15 Dec 2004



SKN11 Beach

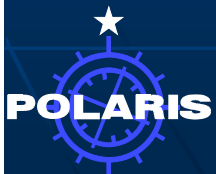


13 July 2005

SKN13 Beach

15 Dec 2004

10 July 2005



15 Dec 2004



SKN14 Wetland

27 Jan 2005
after treatment



10 July 2005



SKN14 Wetland



04 May 2005



13 July 2005

SKN14 Wetland

27 Jan 2005
after treatment



10 July 2005



SKN14 Wetland



27 Jan 2005
during treatment



04 May 2005



13 July 2005

SKN14 Wetland



SKN14 Wetland



04 May 2005



13 July 2005

28 December 2004

Questions?

POLARIS 53° 37.750' N 167° 7.201' W 28 Dec 2004 11:58:28 (local)